

## TRANSMITTAL OF APPEAL BRIEF (Large Entity)

Docket No.  
GRLK-P078-USIn Re Application Of: **David W. Bartley, et al.**

MAR 16 2007

Application No.	TRADEMARK FILING Date	Examiner	Customer No.	Group Art Unit	Confirmation No.
10/629,888	July 29, 2003	Taylor V. Oh	27268	1625	5567

Invention: **PROCESS FOR PRODUCING TETRABROMOBENZOATE ESTERS**COMMISSIONER FOR PATENTS:

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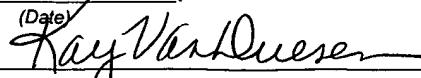
Dated: **March 14, 2007**

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Appeal Brief  
Page 1 of 27

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: David W. Bartley, et al. )  
Application No.: 10/629,888 )  
Filed: July 29, 2003 )  
Title: PROCESS FOR PRODUCING )  
TETRABROMOBENZOATE )  
ESTERS )  
Examiner: Taylor V. Oh )  
Confirmation No.: 5567 )

) Atty. Docket No.: GRLK-P078-US  
Group Art Unit No.: 1625

CERTIFICATE OF MAILING  
(37 C.F.R. § 1.8(a))

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By: Kay VanDusen  
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Dated: March 14, 2007

Board of Patent Appeals and Interferences  
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**Revised APPEAL BRIEF**

Responsive to the Office Action of 03/08/2007, Applicant submits its Revised Appeal Brief in its appeal of its *ex parte* patent application referenced above.

**Prefatory Note**

The instant application was filed 29 July 2003.

This document is the third Appeal Brief following a second re-opening of prosecution pursuant to 37CFR § 41.39(a)(2).

**I. Real Party in Interest**

Great Lakes Chemical Corporation, West Lafayette, Indiana which is wholly owned by Chemtura Corporation, Middlebury, Connecticut.

**II. Related Appeals and Interferences**

None.

**III. Status of Claims**

Claims 1-15, 17-32, and 34-35 are pending.

Claims 1-15 and 17-18 stand rejected pursuant to 35 USC §112, First paragraph.

Claims 1-15, 17-32, and 34 stand finally rejected pursuant to 35 USC §112, second paragraph.<sup>1</sup>

Claims 1-8, 17, 19, 24-25, 27, 31, and 34 stand rejected pursuant to 35 USC §102(b)

Claims 1-15, 17-32, and 34-35 stand finally rejected under 35 USC §103(a) pursuant to I &EC Product Res. and Dev. 8, no. 4, 1969, p. 381-391 in view of U.S. 5,637,757.

**IV. Status of Amendments**

Claims 7 and 27 were amended after the Final Office Action. The amendments were acknowledged and entered in the Advisory Opinion.

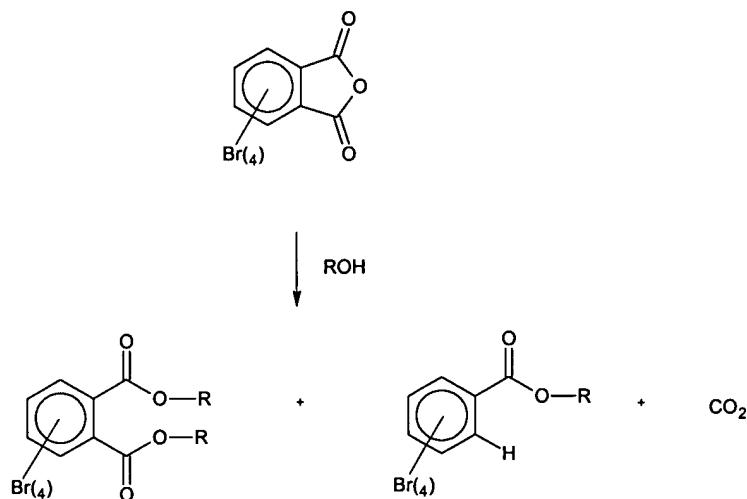
**V. Summary of Claimed Subject Matter**

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<sup>1</sup> The post-appeal office action does not mention claim 35 as having been rejected pursuant to 35 USC §112, second paragraph. The office action is silent as to why claim 35 may have been found allowable as definite. Applicant appeals all claims rejected whether, or not, inadvertently omitted by the office action. This matter was identified by footnote in Applicants' Second Appeal Brief filed 9 June 2006. The matter was not addressed in the OA 12/06/2006.

*The following summary of the claimed subject matter is provided as required by 37 CFR §41.37(c)(v) as an explanation to place the invention in context for the Board. While this explanation is believed to be accurate, applicant does not offer this ‘Summary of Claimed Subject Matter’ as a substitute for the description and claims of the application.*

The claims at issue relate to the preparation of benzoate esters from phthalate and alcohol starting materials. A schematic of the reaction is shown:



The claimed invention addresses a method of increasing the yield of the preferred benzoate ester over the competing phthalate diester.

The following chart identifies written descriptive support for claim elements of independent claims in the specification.<sup>2</sup> Originally filed claims are descriptive support for themselves. *In re Gardner* 475 F.2d 1389, 177 USPQ 396 (CCPA 1973). Descriptive support identified is not exhaustive of the claim support of the specification.

<sup>2</sup> Applicant is not unaware of 37 CFR §41.37(c)(1)(v) and the requirement thereof that page and line for subject matter support be provided in an Appeal Brief. However, 37 CFR §151(b)(6) provides that paragraph numbers may substitute for page and line numbering. Having elected to use paragraph numbers, Applicant does not expect the Board will find it more convenient to locate claim support by page and line numbers by counting down the number of lines from the top of the page, notwithstanding §41.37(c)(1)(v). Despite the internal inconsistency of the rules, Applicant submits the identification of written support by paragraph number will be found compliant with the rules.

Claim element	Source in Specification
1. (Original) A method for preparing tetrabromobenzoate ester from tetrabromophthalic anhydride comprising the steps of:	[0001]
combining the tetrabromophthalic anhydride and an alcohol in at least one reaction vessel to form a first reaction mixture;	[0006]
heating the first reaction mixture to a temperature that favors partial esterification over complete esterification to form a tetrabromophthalate half-ester intermediate mixture;	[0006]
feeding the tetrabromophthalate half-ester intermediate mixture and a catalyst to at least one heated reactor having a temperature that favors decarboxylation over esterification; and	[0006]
maintaining the at least one reactor at the temperature that favors decarboxylation over esterification to produce a tetrabromobenzoate ester-containing product.	[0006]
17. (Previously Amended) A method for preparing a flame retarded polymer resin comprising the steps of:	[0035], [0036], [0037]
combining the tetrabromophthalic anhydride and an alcohol in at least one reaction vessel to form a first reaction mixture;	[0006]
heating the first reaction mixture to a temperature that favors partial esterification over complete esterification to form a tetrabromophthalate half-ester intermediate mixture;	[0006]
feeding the tetrabromophthalate half-ester intermediate mixture and a	[0006]

catalyst to at least one heated reactor having a temperature that favors decarboxylation over esterification;	
maintaining the at least one reactor at the temperature that favors decarboxylation over esterification to produce tetrabromobenzoate ester;	[0006]
preparing a polymer mixture;	[0035], [0036]
and adding the tetrabromobenzoate ester to the polymer mixture.	[0035], [0036], [0037]
19. (Original) A method for the preparation of tetrabromobenzoate esters comprising the steps of:	[0031]
feeding either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and an alcohol to at least one reactor	[0031]
wherein the first of the at least one reactor contains a product mixture, the product mixture comprising tetrabromobenzoate ester,	[0031]
the at least one reactor having a temperature that favors decarboxylation over esterification; and	[0031]
maintaining the at least one reactor at the temperature that favors decarboxylation over esterification to produce a tetrabromobenzoate ester-containing product.	[0031]

## VI. Grounds of Rejection to be Reviewed on Appeal

1. Claims 1 - 15, and 17 – 18 stand rejected pursuant to 35 U.S.C. §112, 1<sup>st</sup> paragraph for non-enablement.

2. Claims 1, 15, 19, 32 and 34 stand rejected pursuant to 35 USC §112, 2nd paragraph, as vague and indefinite, for use of the term "tetrabromobenzoate ester containing product."<sup>3</sup>

3. Claims 1 – 8, 17, 19, 24 – 25, 27, 31, and 34 stand rejected pursuant to 35 USC §102 (b) as anticipated by I & EC Product Res. and Dev. 8, no. 4, 1969, p. 381-391,

4. Claims 1-15, 17-32, and 34-35 stand rejected pursuant to 35 USC §103 (a) as obvious over I & EC Product Res. and Dev. 8, no. 4, 1969, p. 381-391 in view of U.S. 5,637,757.

5. So far as applicant can determine, the foregoing represents all pending claims and all grounds of rejection.

## VII. Argument

### A. Concerning 35 U.S.C. § 112, 1st paragraph, rejections.

Claims 1 – 15 and 17 – 18 stand rejected pursuant to 35 U.S.C. § 112, 1st paragraph for the reason that

"while being enabling for carbonates, alkali bicarbonates, alkalis, and mixtures thereof, as the decarboxylation catalyst, does not reasonably provide enablement for any catalysts generally."

OA, p. 3<sup>4</sup>

Thereafter the Office Action states:

"[t]he specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to include all kinds of catalysts **unrelated to the claimed invention** commensurate in scope with these claims.

<sup>3</sup> See discussion under VII B. Argument. As previously noted, the record is not clear as to which claims stand rejected.

<sup>4</sup> Hereinafter the Office Action of 12/06/2006 is reference as "OA".

*Id.* (emphasis added)

The office action urges that catalysts for chemical art, which the OA states is **unrelated** for example: isomerization of paraffins, and formation of carbocations may not be operable . This later chemical activity being acknowledged in the Office Action to be "unlike the claimed process". OA, p. 7.

Applicants' specification and claim concerns catalysts **related** (not unrelated, as referenced in the Office Action) to the claimed invention.

A rejection for lack of enablement requires that a reason be established to doubt the objective truth of the enablement of the disclosure of the application. *In re Marzocchi et al.* 169 USPQ 367, 369 (CCPA, 1971)

In, *Marzocchi*, the court considered the enablement of a claim limitation to "polyethyleneamine" as an adhesion promoter. The affirmance of the examiner's rejection for non-enablement by the Board (which was reversed by the court) stated:

The term is obviously generic to a considerable number of compounds varying in the number of ethylene groups, the number of amine groups and the relationship of the polyethylene groups to the amine groups, and accordingly does not provide a reasonable guide for those seeking to improve the adherence of vinyl resins to glass.

169 USPQ at 369 (quoting the decision of the board).

This reasoning was properly rejected by the court.

[I]t appears that these comments [by the board] indicate nothing more than a concern over the *breadth* of the disputed term. If we are correct, then the relevance of this concern escapes us. . . . The only relevant concern of the Patent Office under these circumstances should be over the *truth* of any such assertion. The first paragraph of §112 requires nothing more than objective enablement. How such a teaching is set forth, either by the use of **illustrative examples** or by broad terminology, is of no importance.

As a matter of Patent Office practice, then, a specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in

scope to those used in describing and defining the subject matter sought to be patented *must* be taken as in compliance with the enabling requirement of the first paragraph of §112 *unless* there is reason to doubt the objective truth of the statements contained therein which must be relied on for enabling support. Assuming that sufficient reason for such doubt does exist, a rejection for failure to teach how to make and/or use will be proper on that basis; such a rejection can be overcome by suitable proofs indicating that the teaching contained in the specification is truly enabling.

*Id.* (italics in original, bold text supplied)

We will reverse the board's decision on this rejection since we are unable to find sufficient justification for the holding that appellants' disclosure is not enabling.

*Id.*

In *Marzocchi*, as in the instant case, the specification was supported by **illustrative examples**. See, US Patent No. 3,650,818, which issued from the Marzocchi application. The instant OA presented no assertion challenging the objective truth of the illustrative examples of the instant application. The holding of *Marzocchi* requires that in the absence of a challenge to the objective truth of the illustrative examples the rejection of the claimed invention pursuant to §112, First paragraph, is improper and must be withdrawn.

It is also instructive to consider the facts and decision by the Court of Customs and Patent Appeals in *In re Dinh-Nguyen et al.* 492 F2d 856, 181 USPQ 46 (CCPA, 1974). Claims were considered by the court as rejected pursuant to 35 USC §112, First paragraph. The examiner's rejection was affirmed by the board. The Board decision stated:

None of the appealed claims precludes as a starting material compounds containing groups reactive with deuterium peroxide. The specific examples are devoid of representatives thereof, and the specification, therefore, does not demonstrate how the claimed process would produce an improvement where the stated reactants containing reactive groups are employed. We might particularly note that olefinic, and particularly diolefinic, compounds, which may be hydrocarbons, alcohols, ketones or fatty acids as indicated in the dependent claims, react vigorously with hydrogen peroxide to either split, epoxidize or produce other products, dependent

upon reaction conditions. Similar interfering reaction with deuterium peroxide is to be expected and the resulting process is not the *argued* improvement of an old process since the same product is not obtained as is provided where the oxidizing agent is absent and there is no evidence that the process itself is in any way improved.

181 USPQ at 47, quoting the Board decision.

The court reversed the examiner and the Board.

Looking to appellants' specification, we find not only a general discussion of the procedure to be followed but also three specific examples outlining the preparation of the Adams catalyst, the alkali catalyst, and the promoter as well as the exchange reaction with stearic acid, camphor, and anthracene. All the "deuteratable" compounds are of high molecular weight and all are deuterated by appellants' improved process. The obvious general applicability of the procedure so demonstrated fully satisfies the enabling disclosure requirement of 35 U.S.C. 112.

*Id.*

The Federal Circuit subsequently applied the holding of *Dinh-Nguyen* in *Atlas Powder Co. v E.I. Du Pont* 750 F2d 1569, 224 USPQ 409 (Fed.Cir., 1984).

There the Federal Circuit observed,

Even if some of the claimed combinations were inoperative, the claims are not necessarily invalid. "It is not a function of the claims to specifically exclude . . . possible inoperative substances . . . ." *In re Dinh-Nguyen*, 492 F.2d 856, 858-59, 181 USPQ 46, 48 (CCPA 1974) (emphasis omitted).

*Atlas Powder Co. v E.I. Du Pont* 750 F2d at 1576, 224 USPQ at 414.

It is not challenged that the instant disclosure, including examples, enables the practitioner reasonably skilled in the art to make and used the claimed invention. OA, p. 3. The condition of 35 USC §112, First paragraph, obligation is fulfilled thereby.

### **pK<sub>b</sub> is Irrelevant**

The OA references the pK<sub>b</sub> of sodium carbonate and extrapolates therefrom a hypothesis regarding possible catalysts. The OA states **as a fact** that:

[T]his can not be the representatives for all the of [sic] pK<sub>b</sub> range of the basic catalysts of the claimed invention, which would work for the claimed process.

OA at p. 9

The OA does not provide a reference to a source as to how the Patent Office came to possess knowledge as fact that "this can not be the representatives for all the of [sic] pK<sub>b</sub> range of the basic catalysts of the claimed invention, which would work for the claimed process." Applicants neither accept nor reject the accuracy of the statement as neither a source, nor a declaration under oath as to the truth thereof is offered. Applicants call upon the Patent Office to support by affidavit pursuant to 37 CFR §104(d)(2) any facts within the personal knowledge of any individual relied upon as a basis for rejection of the claims of the instant application.

### **Authorities cited by the Office Action**

The OA cites as authority a 1958 decision from the Fourth Circuit: *Merck & Co. v Olin Mathieson Chemical Corp.* 253 F.2d 156 (4CCA, 1958). Like decisions of the various District Courts, the decision is not authority binding on the Federal Circuit, and therefore supportive of acts by the Patent Office. *South Corporation et al. v. United States* 690 F.2d 1368 215 USPQ 657 (Fed.Cir., 1982).

### **Unsupported Assertions of Fact**

The OA recites unsupported assertions of fact which cannot form a basis for rejection of claims pursuant to 35 USC § 112, First paragraph. *Marzocchi, supra*.

There is no support for the assertion that the amount of experimentation is 'undue'. OA 10. No art or declaration is identified related to failed efforts to make and use the claimed invention, by a person skilled in the art, based upon the disclosure provided in the specification.

The OA states the level of skill necessary to carry out the esterification is 'high'. However, no support is offered, nor is 'high' equated with a level of education, training, experience, or combination thereof.

As noted above, Applicants call upon the Patent Office to support by affidavit pursuant to 37 CFR §104(d)(2) any facts within the personal knowledge of any individual relied upon as a basis for rejection of the claims of the instant application.

**Specifically enabled dependent claim**

Dependent claim 10 identifies a Markush group of catalysts. The OA specifically states the specification to be enabling for the Markush group members. OA, p. 3. Yet, Dependent claim 10 is inexplicably rejected for lack of enablement.

**35 U.S.C., First paragraph Rejection 1 – 15 and 17 – 18**

For the reasons that the rejection based on unsupported assertions of fact, and erroneous constructions of law, including being based on non-controlling precedent, the rejection of claims 1 – 15 and 17 – 18 pursuant to 35 U.S.C. § 112, 1st paragraph, should be withdrawn.

**B. Concerning 35 U.S.C., 2nd paragraph, rejections.**

Claims 1-15, 19-32, and 34-35 stand rejected pursuant to 35 U.S.C. § 112, 2nd paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The foregoing rejection was first raised in the final office action precipitating the initial appeal of this action. Applicants consistently responded that the pending claims are properly formed. Office actions have consistently denied the same, with the second office action after appeal dated 03/23/2006 adding a citation to the decision of *Ex parte Muench, et al.* 79 U.S.P.Q. 92 (BPAI 1948). The office action of 3/23/2006 elaborates on the rejection by urging that the verbs "containing", and "comprises", admit components in addition to tetrobromobenzoate ester.

There is uncertainty as to what other compounds are present in the product. Furthermore, it is well settled that the term “containing” do [sic does] not exclude the presence of other ingredients than the one recited.”

Office Action 3/23/2006, p. 3

The foregoing is repeated in the office action of 12/06/2006, verbatim.

Applicants do not disagree that the verbs ‘containing’, and ‘comprising’ used in patent claims admit other ingredients. *Ex parte Muench, et al.* supports the same. The terms are known and well understood concepts in the preparation of patent claims. It has been the law since at least *Ex parte Davis* 80 U.S.P.Q. 448, (BPAI 1948) that claims of an “open” nature, those using the verb “comprising” leav[e]s the claim open for inclusion of unspecified ingredients”. *Id.* at 450.

That there may be “other components present in the product besides the tetrabromobenzoate ester” is not a basis for rejection under 35 U.S.C. § 112, 2nd paragraph. That statute requires that claims “particularly point out and distinctly claim”. Compliance with the statute is tested by whether the claim would be understood by a person of ordinary skill in the art.

This first inquiry therefore is merely to determine whether the claims do, in fact, set out and circumscribe a particular area with a reasonable degree of precision and particularity. It is here where the definiteness and the language employed must be analyzed - not in a vacuum, but always in light of the teaching of the prior art and of the particular application disclosure as it would be interpreted by one possessing the ordinary level of skill in the pertinent art.

*In re Moore*, 58 CCPA 1042, 1046-1047, 439 F.2d 1232, 1235, 169 U.S.P.Q. 236, 238 (1971) (footnote omitted, emphasis added).

There is no assertion in any office action that a person of ordinary skill in the art would be confused by the scope of the claim language. As such, the office actions fail to state a lawful basis for rejections of claims 1-15, 19-32, and 34-35 pursuant to 35 USC §112, Second

paragraph as indefinite. The office actions state the potential for the presence of other ingredients as the basis for the 35 U.S.C. § 112, 2nd paragraph, rejection. The office action confuses claim breadth with indefiniteness. “Breadth is not indefiniteness” *In re Gardner et al.* 57 CCPA 1207, 1210, 427 F.2d, 786, 788, 166 U.S.P.Q. 138 (CCPA 1970); see also *In re Robins*, 57 CCPA 1321, 1328, 429 F.2d 452, 458, 166 U.S.P.Q. 552 (CCPA 1970). The fact that components in addition to the tetrabromobenzoate ester may be present does not render the claim indefinite. The claim fully satisfies the statutory mandate of 35 U.S.C. § 112, Second paragraph. For the foregoing reasons, the stated rejection of claims 1-15, 17-32, and 34-35 for indefiniteness must be reversed.

**C. Concerning 35 U.S.C. §102 (b) rejections.**

Claims 1-8, 17, 19, 24-25, 27, 31 and 34 stand rejected over I &EC Product Res. and Dev. 8, no. 4, 1969, p. 381-391, as anticipated.

**The Office Action admits the reference does not anticipate**

The OA acknowledges on its face that the rejection of the above claims as anticipated pursuant to 35 U.S.C. §102 (b) is unwarranted. At OA, p. 17 a comparison between the claims, including those claims recited above as anticipated, and the reference I &EC Product Res. and Dev. 8, no. 4, 1969, p. 381-391 the OA states:

[T]he instant invention differs from the prior art in that there is a specific decarboxylation catalyst used in the claimed process unlike the prior art process; the claimed reactor includes a plurality of heated reactors in series.

OA, p. 17.

No catalyst is disclosed by the cited reference, in contrast to applicants claims 1 – 15, 17 – 18, and 20 – 23 which call for a catalyst. The law of anticipation requires there be no difference between a claimed invention and the applied reference, as viewed by one skilled in the field of invention. *Scripps Clinic & Research Foundation v Genentech, Inc*, 927 F.2d 1565,

1576 (Fed.Cir., 1991). As all elements of the claimed invention are not present in the I &EC reference, the claims cannot be anticipated.

**The applied reference does not disclose the feeding step.**

All claims rejected for anticipation, Claims 1-8, 17, 19, 24-25, 27, 31 and 34, call for feeding reactants including a tetrabromobenzoate monoester to a reactor maintained at a temperature that favors decarboxylation.

It is not apparent where in the cited reference it may be stated that the process of forming a tetrabromobenzoate ester would describe feeding tetrabromophthalate monoester and a catalyst to at least one heated reactor having a temperature that favors decarboxylation over esterification.

At p. 382, r.h. column, the reference discloses formation of a monoester of tetrabromophthalic anhydride. Continuing to p. 383, the reference discloses isolating the monoester of tetrabromophthalic anhydride and heating the same in a dry state to form "the anhydride and the alcohol".

Under the heading DIESTERIFICATION OF TBPA at p. 383 there is discussed formation of diesters and, above temperatures of 185°C decarboxylation was observed. However, there is no indication found, or referenced in the OA, to the feeding of the claimed tetrabromophthalate half-ester intermediate mixture to at least one heated reactor having a temperature that favors decarboxylation over esterification. Furthermore, the data in Figure 4, p. 383 of the cited reference confirms that the reference does not disclose the claimed feeding. The data of Figure 4 concerns esterification of tetrabromophthalic anhydride with the same monohydric alcohol as Example II of the instant application. The data of Figure 4 shows formation of the tetrabromophthalate diester at a rate equivalent to decarboxylation to form the corresponding benzoate ester. In contrast, the data of the instant application show that by practice of the claimed invention, the preferred benzoate ester is present at over 90% yield, Example II.

As discussed, it is apparent that the reference I &EC Product Res. and Dev. 8, no. 4, 1969, p. 381-391 does not anticipate any claim of the invention rejected as anticipated.

**Concerning 35 U.S.C. §103 (a) rejections.**

**Claims 1-15**

I & EC Product Res. and Dev. 8, no. 4, 1969, p. 381-391 is relied upon as the primary reference in the instant rejection of claims 1-5, 17-32, and 34-35 under 35 U.S.C. § 103(a). The OA acknowledges that I & EC reference fails to include a decarboxylation catalyst, or "a plurality of heated reactors in series." OA, p.17

The general lack of relevance of the reference is discussed above under the discussion of anticipation.

U.S. Patent 5,637,757 is relied upon to supply the missing catalyst component of the rejected claims. However, as will be seen, the combination of references fails to disclose the claimed feeding to a heated reactor step, or the claimed temperature of the heated reactor.

The '757 patent is further represented as disclosing "a two step procedure". OA p. 19. '757, col. 1, lines 46 – 48 are referenced for support for the 'two step procedure' statement. OA p. 19. The cited lines state:

The reaction proceeds through rapid esterification of the anhydride, followed by decarboxylation to yield the tetrabromobenzoate.

'757, col. 1, lines 46-48.

The cited language describes a two-step reaction from the raw material to the desired product. It is a mischaracterization to state that the cited language discloses a "two step procedure". Furthermore the OA identified no portion of the '757 reference teaching that the tetrabromobenzoate ester was formed in more than a single vessel, or that there was a 'feeding' of a reaction mixture to a reactor heated to a temperature favoring decarboxylation.

## Rejection of Claims for Obviousness

### Basis for Combining References

A basis for combining references must be identified by the office actions:

While the references need not expressly teach that the disclosure contained therein should be combined with another, the showing of combinability must be "clear and particular."

*Ruiz v A.B. Chance Co.* 234 F.3d 654, 665, 57 U.S.P.Q. 2d 1161, 1167-1168. (Fed. Cir. 2000) (internal citations omitted).

The OA cites as motivation to employ heated reactors in series, a desire by a skilled artisan "to apply the plurality of heated reactors in series so as to optimize the cost of operations." The cited motivation is not supported by the references as there is no basis on which an artisan can conclude that a plurality of reactors is in fact "less expensive" than a single reactor as taught by I &EC, or by '757. The OA does not offer a capital cost for a plurality of reactors, or of the associated piping, or controls. The OA does not offer a comparison capital cost for a single reactor and associated piping and controls. The OA does not offer a comparison of the variable cost of labor associated with operating a plurality of reactors or of operating a single reactor. The OA does not consider the cost of separation of the desired benzoate ester from other ingredients of the reacted mixture from a single reactor system as compared to the separation cost for the plurality reactor system.

Moreover, the examples of the instant application show the product of the claimed method has a lower Gardner color (Table II) and therefore may command a higher sale price, or be preferred by customers. No reference is identified that teaches or suggests that the claimed method unexpectedly yields a higher quality product.

### Combined References Do Not Arrive at the Invention

It is further required that fairly combined references arrive at the claimed invention. *ACS Hospital Systems, Inc. v Montefiore Hospital*, 732 F.2d 1572, 1577, 221 U.S.P.Q. 929, 933 (Fed.

Cir. 1984); *In re Geiger* 815 F.2d 686, 688, 2 U.S.P.Q. 2d 1276, 1278 (Fed. Cir. 1987). The references of record, even when combined, do not arrive at the claimed invention. As to claims 19-32, and 32-34 no reference of record, nor combination thereof, discloses feeding reactants to a product mixture containing tetrabromobenzoate or feeding reactants to a reactor with contents having a temperature that favors decarboxylation over esterification. For this reason also the rejection of claims 19-32, and 32-34 must be reversed.

Furthermore, in addition to the lack of teaching in either reference of 'a plurality of reactors in series' the OA fails to identify a teaching or suggestion that such 'a plurality of reactors in series' should be heated to a temperature favoring decarboxylation prior to receipt of a mixture containing tetrabromophthalate half-ester. As to claims 1-15, no reference of record, nor combination thereof, discloses feeding the tetrabromophthalate half-ester intermediate mixture and a catalyst to at least one heated reactor having a temperature that favors decarboxylation over esterification. For this reason also the rejection of claims 1-15 for obviousness must be reversed.

### **Use of Applicants Claims as a Roadmap**

The analysis in the examination finds no suggestion or motivation to combine the references I & EC and '757. Rather, the analysis reconstructs applicants' claims using the claims themselves as a guide. Only by picking and choosing components from the applied references does the instant examination arrive at the urged rejection of claims 1-15, 17-32, and 34-35.

The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that this process should be carried out and would have a reasonable likelihood of success, viewed in the light of the prior art. Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure.

*In re Dow Chemical* 837 F.2d 469, 473, 5 U.S.P.Q. 2d 1529, 1531 (Fed. Cir. 1988) (internal citations omitted).

There must be a reason or suggestion in the art for selecting the procedure used, other than the knowledge learned from the applicant's disclosure.

*Id.*, at 1532.

To imbue one of ordinary skill in the art with knowledge of the invention in suit, when no prior art reference or references of record convey or suggest that knowledge, is to fall victim to the insidious effect of a hindsight syndrome wherein that which only the inventor taught is used against its teacher.

*W.L. Gore and Assoc. v Garlock, Inc.* 721 F.2d 1540, 1553, 220 U.S.P.Q. 303, 312-13 (Fed. Cir. 1983), quoted in *In re Fine* 837 F.2d 1071, 1075, 5 U.S.P.Q. 2d 1596, 1600 (Fed. Cir. 1988).

The office actions demonstrate no lawful reason to combine the teachings of the applied references. Rather the office actions demonstrate the use of applicants' claims as a guide to pick and choose components of the claims from among references. Aided by factual misrepresentations of the teachings of the references the claims are rejected for obviousness.

#### **Applied References Must Be Considered "as a whole"**

Further, in considering prior art references it is essential that the references be considered "as a whole". *In re Lunsford* 357 F.2d 385, 389, 148 U.S.P.Q. 721 (CCPA 1966).

The OA states concerning the I & EC reference that

"[ I & EC] does disclose the reaction step that favors partial esterification over complete esterification to form a tetrabromophthalate half-ester intermediate mixture as well as **another step that favors decarboxylation over esterification under specific reaction temperatures.**"

OA, p. 19. (emphasis added)

The OA makes no reference to any portion of the I & EC reference supporting the assertion of temperatures favoring decarboxylation over esterification. Applicants find contrary statements in the I & EC reference at p. 383. "The substantial decarboxylation at 195-200°C,

occurring at about the same rate as the esterification of the second carboxy group (Figure 5) indicated an upper temperature limit for a reasonable diesterification with minimal side reaction." Again in the Summary, I & EC at p. 390 states: "Prolonged heating above 185°C increases the rate of diesterification, with a concomitant increase of the decarboxylation rate of the unreacted -COOH group."

The benzoate esters of applicants' claims would be, in the terms of the I & EC reference, a "side reaction" to the preparation of the phthalate diester.

The OA mischaracterizes the disclosure of the I & EC reference and draws unsupported conclusions based thereon. Considered "as a whole" there is no teaching in the I & EC reference that decarboxylation is favored over competing diesterification.

The references may not be combined consistent with the law. When combined, the combined disclosures do not arrive at the invention, as claimed.

Wherefore, applicants pray that this board:

1. Reverse the rejection of claims 1-15, and 17-32 for lack of enablement pursuant to 35 U.S.C. § 112, First paragraph;
2. Reverse the rejection of claims 1-15, 17-32, and 34-35 as indefinite pursuant to 35 U.S.C. § 112, Second paragraph;
2. Reverse the rejection of claims 1-15, 17-32 and 34-35 as obvious pursuant to 35 U.S.C. § 103(b); and
3. Extend the term of the patent to be granted on claims 1-15, 17-32, and 34-35 pursuant to 35 U.S.C. § 154.

Respectfully submitted,



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## VIII Claims Appendix

1. (Original) A method for preparing tetrabromobenzoate ester from tetrabromophthalic anhydride comprising the steps of:
  - combining the tetrabromophthalic anhydride and an alcohol in at least one reaction vessel to form a first reaction mixture;
  - heating the first reaction mixture to a temperature that favors partial esterification over complete esterification to form a tetrabromophthalate half-ester intermediate mixture;
  - feeding the tetrabromophthalate half-ester intermediate mixture and a catalyst to at least one heated reactor having a temperature that favors decarboxylation over esterification; and
  - maintaining the at least one reactor at the temperature that favors decarboxylation over esterification to produce a tetrabromobenzoate ester-containing product.
2. (Original) The method of claim 1 wherein the temperature that favors partial esterification over complete esterification is greater than about 70°C.
3. (Original) The method of claim 2 wherein the temperature that favors partial esterification over complete esterification is between about 90°C and about 130°C.
4. (Original) The method of claim 1 wherein the temperature that favors decarboxylation over esterification is above about 190°C.
5. (Original) The method of claim 4 wherein the temperature that favors decarboxylation over esterification is between about 190°C and about 205°C.
6. (Original) The method of claim 1 wherein the alcohol has a boiling point between about 100°C and about 230°C.
7. (Previously Amended) The method of claim 1 wherein the alcohol has the formula ROH, and wherein R is an organic group having up to about 30 carbon atoms.
8. (Original) The method of claim 1 wherein said step of combining the tetrabromophthalic anhydride and an alcohol occurs in the presence of an inert solvent.

9. (Original) The method of claim 8 wherein the inert solvent is an ether having a boiling point between about 160°C and 230°C.

10. (Original) The method of claim 1 wherein the catalyst is a compound selected from the group consisting of carbonates, alkali bicarbonates, alkalis, and mixtures thereof.

11. (Previously Amended) The method of claim 1 wherein at least 85% of the tetrabromobenzoate ester-containing product consists of tetrabromobenzoate ester.

12. (Original) The method of claim 1 wherein the at least one reactor contains tetrabromobenzoate ester when feeding the tetrabromophthalate half-ester intermediate mixture to at least one heated reactor.

13. (Original) The method of claim 1 wherein the at least one reactor includes a plurality of heated reactors connected to one another in series.

14. (Original) The method of claim 13 wherein the first of the plurality of heated reactors contains tetrabromobenzoate ester when the tetrabromophthalate half-ester intermediate mixture is fed to at least one heated reactor.

15. (Original) The method of claim 1 wherein said step of feeding the tetrabromophthalate half-ester intermediate mixture is continuous such that the half-ester intermediate mixture is continuously fed to the at least one reactor, while the tetrabromobenzoate ester-containing product is continuously removed from the at least one reactor.

16. (Cancelled).

17. (Previously Amended) A method for preparing a flame retarded polymer resin comprising the steps of:

combining the tetrabromophthalic anhydride and an alcohol in at least one reaction vessel to form a first reaction mixture;

heating the first reaction mixture to a temperature that favors partial esterification over complete esterification to form a tetrabromophthalate half-ester intermediate mixture;

feeding the tetrabromophthalate half-ester intermediate mixture and a catalyst to at least one heated reactor having a temperature that favors decarboxylation over esterification;

maintaining the at least one reactor at the temperature that favors decarboxylation over esterification to produce tetrabromobenzoate ester;

preparing a polymer mixture; and

adding the tetrabromobenzoate ester to the polymer mixture.

18. (Previously Amended) The method of claim 17 wherein the polymer mixture comprises polyvinyl chloride, polyurethane, or mixture thereof.

19. (Original) A method for the preparation of tetrabromobenzoate esters comprising the steps of:

feeding either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and an alcohol to at least one reactor wherein the first of the at least one reactor contains a product mixture, the product mixture comprising tetrabromobenzoate ester, the at least one reactor having a temperature that favors decarboxylation over esterification; and

maintaining the at least one reactor at the temperature that favors decarboxylation over esterification to produce a tetrabromobenzoate ester-containing product.

20. (Original) The method of claim 19 wherein said product mixture includes a decarboxylation catalyst.

21. (Original) The method of claim 20 wherein the decarboxylation catalyst is a compound selected from the group consisting of carbonates, alkali bicarbonates, alkalis, and mixtures thereof.

22. (Original) The method of claim 19 said step of feeding either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and an alcohol to at least one reactor further includes feeding a decarboxylation catalyst to the at least one reactor.

23. (Original) The method of claim 22 wherein the catalyst is a compound selected from the group consisting of carbonates, alkali bicarbonates, alkalis, and mixtures thereof.

24. (Original) The method of claim 19 wherein the temperature that favors decarboxylation over esterification is above about 190°C.
25. (Original) The method of claim 24 wherein the temperature that favors decarboxylation over esterification is between about 190°C and about 205°C.
26. (Original) The method of claim 19 wherein the alcohol has a boiling point between about 100°C and about 230°C.
27. (Previously Amended) The method of claim 19 wherein the alcohol has the formula ROH, and wherein R is an organic group having up to about 30 carbon atoms.
28. (Original) The method of claim 19 further comprising the step of adding an inert solvent to the at least one reactor, the inert solvent having a boiling point above about 160°C.
29. (Original) The method of claim 28 wherein the inert solvent is an ether.
30. (Original) The method of claim 19 wherein the at least one reactor includes a plurality of reactors connected in series to one another.
31. (Original) The method of claim 19 further comprising the step of combining the either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and the alcohol to form a first reaction mixture prior to said step of feeding the tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and the alcohol.
32. (Original) The method of claim 19 wherein said step of feeding the tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and the alcohol to at least one reactor is continuous such that either tetrabromophthalic anhydride, tetrabromophthalic diacid, or mixture thereof, and an alcohol are continuously fed to the at least one reactor, while the tetrabromobenzoate ester-containing product is continuously removed from the at least one reactor.
33. (Cancelled).
34. (Previously Amended) A method for preparing a flame retarded polymer resin comprising the steps of:
  - forming a tetrabromobenzoate ester-containing product using the method of claim 19;

preparing a polymer mixture; and  
adding the tetrabromobenzoate ester-containing product to the polymer mixture.

35. (Previously Amended) The method of claim 34 wherein the polymer mixture comprises polyvinyl chloride-polyurethane, or mixture thereof.

**IX. Evidence Appendix**

none

**X. Related Proceedings Appendix**

none